

Remarks/Arguments

Claims Summary

By this Amendment, claims 1-3, 5-6 and 13-14 have been revised, and claim 8 has been cancelled.

Claims 1-3, 5-7 and 9-15 are now pending in the application.

Allowable Subject Matter

Applicants acknowledge with thank the indicated allowance of claims 7, 11 and 15.

35 U.S.C. ¶103 – Claims 1-3, 5, 6 and 8-10

Claims 1-3, 5, 6 and 8-10 were rejected under 35 U.S.C. ¶103 as being unpatentable over Kitakado et al.

Initially, it is noted that the rejection of claim 8 has been rendered moot by the cancellation of claim 8.

In the Office Action, the Examiner states:

“... Kitakado et al. disclose a method of sputtering a tungsten-containing film from a tungsten target (Col. 14, lines 43-45) onto a semiconductor wafer including using krypton or xenon as a sputter gas (Col. 1, lines 65-68).”

The Examiner makes reference to Kitakado et al. at column 14. The first two sentences of the relevant passage (lines 43-55) discuss sputtering tungsten amongst other metals. It then turns to the separate case of forming either TaN or WN and suggests replacing the argon, which is apparently used in the first sputtering method, with nitrogen or nitrogen containing gases and then goes on to suggest that the stress of the nitride films may be controlled by adding helium, krypton “and” xenon to the gas for sputtering. Strictly this is disclosure of adding all three of these gases, but it appears that the Examiner is reading

the ‘and’ as an ‘or’. However, the substantive point is that the krypton (whether alone or in combination with the other noble gases) is disclosed for use in a reactive sputtering process for forming a nitride film.

In the light of this, and in an effort to expedite prosecution, claims 1, 5 and 6 have been revised to delete the reference to “tungsten containing films” is removed from claims 1, 5 and 6. Thus, these independent claims and their dependencies are directed to the formation of tungsten films and clearly define over the Kitakado et al. reference.

For at least these reasons, reconsideration of the rejection of claims 1-3, 5, 6 and 9-10 is requested.

35 U.S.C. ¶103 – Claim 13

Claim 13 was rejected under 35 U.S.C. ¶103 as being unpatentable over Kitakado et al. in view of Taguwa (US 6800543) and Matsumoto et al. (US 6451690).

In the Office Action, the Examiner states:

“Matsumoto et al. discloses [that] metal films can be continuously formed by using the same target placed in the same chamber by merely changing the kind of gas to be used for the sputtering (Col. 5, lines 33-36).”

Without acquiescing to the Examiner’s reasoning, claim 13 has been amended herein to clarify that the krypton or xenon gas is used as a sputter gas for both of the sputtering processes carried out in the same chamber.

For at least this reason, reconsideration of the rejection of claim 13 is requested.

35 U.S.C. ¶103 – Claim 14

Claim 14 was rejected under 35 U.S.C. ¶103 as being unpatentable over Taguwa in view of Matsumoto et al.

Taguwa at column 5 discloses deposition of a tungsten nitride film using argon and nitrogen and then, at lines 61-66, teaches that the flow of nitrogen is stopped and tungsten is sputtered "only by using argon gas." Given this specific requirement, it would not be obvious to add krypton to the process as recited in amended claim 14, especially where the processes are conducted in the same chamber.

For at least the reasons stated above, Applicants respectfully contend that claim 14 defines over Taguwa and Matsumoto et al., taken individually or in combination.

Conclusion

No other issues remaining, reconsideration and favorable action upon the claims now pending in the application are requested.

Respectfully submitted,

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